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ABSTRACT

The state of Australian online education and training practices was examined through a literature review and interviews. Special attention was paid to the following aspects of online vocational and technical education (VET) and technical and further education (TAFE): current online implementations; online teaching strategies; issues for online learners; resource implications; policy; evaluation and outcomes; and directions for further research. The review confirmed the embryonic nature of online delivery in Australia's VET and TAFE sectors. However, the evidence suggests that online delivery will begin to mature once innovators begin developing realistic, pedagogical and commercial models. Although significant online activities are evident in all of Australia's states and territories, online delivery in the VET sector has yet to become a mainstream activity. Publications on designing, developing, and evaluating online learning environments are lacking, as is information about learners' experience and needs in the online mode. Although many institutions have begun developing mechanisms for preparing and supporting online learners and have published policies on online delivery of education and training, few have taken the next step of formalizing their approaches to online delivery. (The

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bibliography lists 65 references. A list of nine organizational sources and the interview protocol are appended.) (MN)

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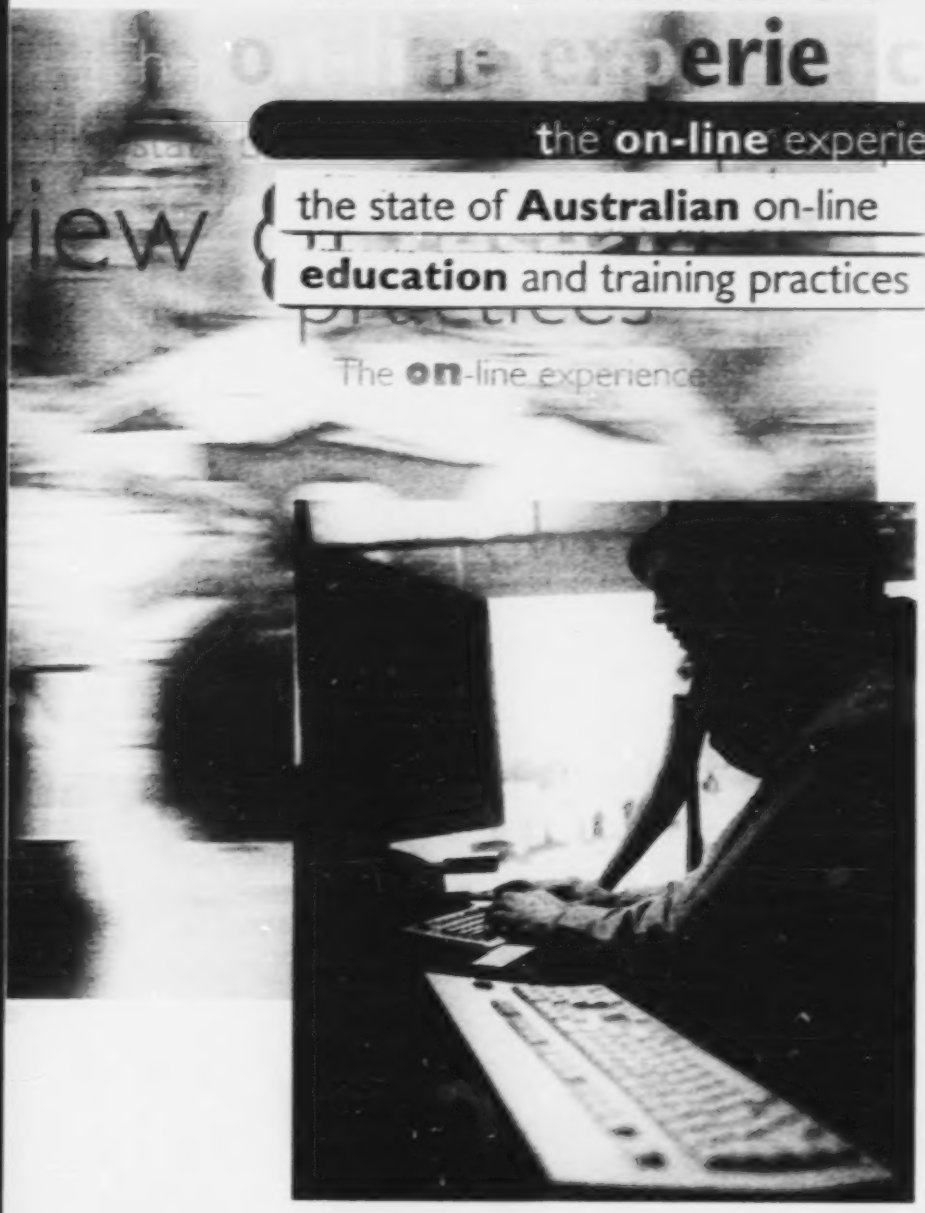
review of research

the on-line experience:

the state of **Australian** on-line **education** and training practices



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review of **research**

the on-line experience: the state of Australian on-line education and training practices

Barry Harper
John Hedberg
Susan Bennett
Lori Lockyer

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acronyms

ACE	adult community education or adult and community education
ALT'99	Association for Learning Technology, UK (annual conference)
ANTA	Australian National Training Authority
ASET	Australian Society for Educational Technology
ASCILITE	Australian Society for Computers in Learning in Tertiary Education
CAL'99	Computer Assisted Learning, UK (annual conference)
CIT	Canberra Institute of Technology
EDMEDIA	World Conference on Educational Multimedia, Hypermedia and Telecommunications (organised by the Association for the Advancement of Computing in Education, USA)
EDUCAUSE	Conference for Information Technology (Australia)
EdNA	Education Network Australia (On-line Resources for Education)
HERDSA	Higher Education Research and Development Society of Australasia (mainly higher education)
HTML	hypertext markup language
ICT	information and communication technology
ICCE	International Conference on Computers in Education (Asian Chapter of AACE)
IT	information technology
QOLN	Queensland Open Learning Network
RTO	registered training organisation
TAFE	technical and further education
TAFE VC	TAFE Virtual Campus
VET	vocational education and training

executive summary

This review illustrates the embryonic nature of on-line delivery, not only in the Australian vocational education and training (VET) sector, but in higher education generally. However, evidence suggests that the maturation of on-line delivery will be realised once innovators begin to develop realistic strategic, pedagogical and commercial models. This picture is supported by issues raised in the literature and by the key stakeholders who were consulted during the preparation of this review.

While its true extent is difficult to gauge, on-line delivery in the VET sector is yet to become a mainstream activity, despite significant on-line activities evident in each State and Territory. The diversity of these activities is indicative of the early stage of development of on-line learning and evidenced by extensive exploration and experimentation. There is currently no universally accepted wisdom on the best method for implementing on-line learning, either in Australia or internationally. Early indicators of success are beginning to emerge as a significant cohort of innovators implement and evaluate a variety of models.

Most anecdotal reports about the success of on-line delivery are positive, with a number of studies emphasising the changing nature of teaching and the implications for how best to support students in on-line environments. There is a recognition that the role of the instructor and their teaching approach changes in the on-line environment. Traditional face-to-face instructional strategies and resources need to be reconceptualised for on-line learning. Accompanying this is the need for teachers and support staff to develop instructional design skills for implementing effective on-line programs.

Better design models are required to support development teams in reconceptualising traditional modes of instruction for on-line delivery. The VET sector is characterised by a lack of published reporting of the design, development and evaluation of on-line learning environments. This results in a limited base of relevant literature from which other practitioners might draw. The few published design models tend to be primitive and may militate against success.

Only vague information exists about the learner's experience and needs in on-line mode. A common view is that learners need to be prepared and supported through the initial stages of use of on-line environments and many institutions are

developing appropriate mechanisms. Much of the current evaluation in the VET sector is informal. However, some evaluation studies have noted that positive gains have been made relating to students with lower levels of language skills which indicates that these learning environments are providing options for specific groups. In addition, evidence is emerging that the traditionally high drop-out rates for distance education may be decreased with the use of on-line delivery, provided it is structured to support effective learning interactions. While there may be some criticism about a lack of cohesiveness in on-line delivery, policy-makers should not be too concerned since this is indicative of its current stage of development in Australia. It may be that such an environment is necessary to support innovation and the development of a variety of models.

Many institutions have published policies on the delivery of education and training, but few have taken the next step of formalising their approach to on-line delivery. However, it may yet be too early in the development cycle to see well-articulated policies. Currently, addressing the resource implications for infrastructure, personnel, professional development and administration tends to be ad hoc unless systems are centralised. The real costs of developing on-line programs are rarely fully examined before projects are begun, and more comprehensive costing and cost-effectiveness studies are required to inform administrators and funding bodies in decision-making.

In defence of the lack of policy initiatives, constant change in the capability of the technology and user access militates against comprehensive policy development. New funding models are being developed to reflect the changing resource priorities and partnerships. An examination of the most appropriate methods for reducing costs and increasing access may become crucial for 'scaling-up' on-line offerings. The attractiveness of on-line learning as a means of reaching new student groups may encourage new collaborations and partnerships to include a wide variety of State, national and international bodies.

context

aim

The aim of this consolidation study was to draw together recent literature and examples of current practice to provide an overview of the state of on-line delivery in education and training in Australia. In addition to exploring the scope of on-line education and, specifically, training, this study sought to identify key issues of interest to both practitioners and policy-makers. The target audiences for this project include:

- educators and trainers beginning to explore the potential of on-line delivery who require guidelines for start-up and best practice
- educators and trainers currently involved in on-line delivery who wish to understand the wider scope of practice in Australia as a frame of reference for their experience
- education and training administrators and policy-makers who are charged with the responsibility for exploring the resource implications of on-line delivery and for developing policy related to delivery

this study sought to identify key issues of interest to both practitioners and policy-makers.

focus

The study focussed upon relevant publications dating from 1993, with particular attention to the Australian research literature. To complement the literature, the research team also sourced unpublished information relating to recent developments and initiatives yet to be formally reported.

content

The report summarises findings within seven key areas. These are:

- the current state of on-line implementation in education and training in Australia

- the impact of on-line delivery on instructional strategies and teaching practice
- issues faced by learners engaging in on-line education and training
- implications of on-line delivery in terms of human and physical resources
- the impact of on-line delivery on organisational policies
- outcomes realised when education and training are delivered on-line
- possible directions and perceived trends in future research and development

approach

The information presented in this report was generated from the following sources:

- Bibliographic databases
  Databases such as Australian Education Index (AUSTROM: AEI), ERIC, PSYCLIT and SOCIOFILE were searched for references using a strategy that ensured the capture of all relevant citations since 1993. While Australian sources were the focus of these activities, international sources were also accessed and reviewed as appropriate.
- Education and training specific databases
  Databases such as VOCED, OLEARN and EdNA, which are specifically designed to maintain an up-to-date listing of publications and developments in the education and training sector, were consulted.
- World wide web
  Many educators and trainers involved in the design, implementation and evaluation of on-line delivery communicate their methods, experiences and outcomes within the on-line environment. An extensive search was conducted using world wide web meta-search engines to locate and access such information. Again, while Australian sources were the focus, international sources were also accessed and reviewed as appropriate.
- Interviews with representatives of relevant institutions and organisations
  It was anticipated that much of the current practice in on-line delivery of education and training would not be documented. Thus, to capture the true picture of current practice, it was necessary to contact relevant Australian organisations such as universities, TAFE institutions and other training providers. A list of relevant and representative organisations was developed and key contributors and policy-makers were contacted by an evaluation team member to request their participation in this consolidation study. Representatives from these organisations participated in a telephone interview which covered the key issues outlined above.

The interview questions and organisations contacted may be found in the appendix of this document. Only Australian sources were targetted.

- Other documents in the public domain
  It was presumed that much of the current practice in on-line delivery of education and training in the VET sector would not be reported in traditional formats, unlike the higher education sector where there is an abundance of literature. Other documents in the public domain such as reports, opinion pieces, editorials, teacher reflections, information/ promotion documents and unpublished materials supplied by institutions were sought in an attempt to capture this information.
- Conference attendance and proceedings
  The past three years of proceedings of the key national and international conferences focussing on on-line learning were scanned for relevant papers and reviewed as appropriate. In addition, team members attended and, in some cases, contributed to many of these conferences, for example, Networking '97 and '99 as well as ASCILITE, EDMEDIA, EDUCAUSE, ICCE, ALT'99, CAL'99, ASET and HERDSA.

The research approach undertaken has strengths and limitations. This report seeks to provide an overview of the issues, with some further insights from the literature and interview comments. Thus, what is presented is an indicative, but not complete picture. For example, if, as has been assumed in this study, documentation in the VET sector is limited, vital innovations may have been overlooked. It is unclear how representative these data sources are of the actual practice.

Interview protocols of the type used in this study also have some limitations in that:

- Interviewees may not wish to discuss commercially or politically sensitive issues.
- Lengthy interviews constrain the number of people that can be interviewed in a limited time frame.
- Individuals at different levels in organisations have different perspectives.

introduction

Government policies, workplace trends, changes in the post-compulsory education sector and the availability of new technologies are influencing education and training provision in Australia.

Global and local trends are changing the nature of work and, with that, the requirements for education and training. Many commentators argue that we are moving towards an 'information economy' in which new knowledge-based industries will emerge, and the 'knowledge worker' will be required to develop new skills and

evolve these skills within an ever-changing employment environment (Romiszowski 1997). The availability of further education and training will become critical in the transition to these new ways of working.

In its report, *A strategic framework for the information economy*, the Commonwealth Government highlighted the importance of 'access to lifelong learning opportunities to ensure that [Australians] can obtain the on-line skills required in both the workplace and the community' (Commonwealth of Australia 1998, p.10). This link between the principles of lifelong learning and use of information and communication technology (ICT) is reflected in the move by many educational organisations in adapting their policies and practices to support a more flexible approach to learning. Flexibility has become the catch-cry of post-compulsory education.

On-line technologies are seen by many to offer support to flexible delivery strategies and there is evidence that the application of such technologies to education and training is increasing (Collis & Oliver [eds] 1999). Teachers and trainers are attracted by the new possibilities for any-time, any-place access to information and the new opportunities for contact and interaction through a variety of communication tools. Reports from current practitioners suggest that, rather than being a straightforward conversion process, moving to on-line mode requires a reconceptualisation of teaching and learning. Such a move necessitates the development of new skill-sets on the part of the both teacher and learner and impacts upon the resources, structure and practices of educational organisations.

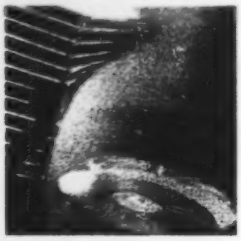
A number of questions are raised in the attempt to develop a current picture of the on-line experience in Australian education and training:

- To what extent are Australian education and training organisations, particularly those in the VET sector, embracing on-line delivery and how is it being implemented in their different contexts?
- What kinds of issues are teachers and learners facing in the new on-line environment and what strategies are being developed in response?
- How do internal and external factors relating to on-line delivery impact upon the resources, practices and policies of educational organisations?
- What is known of the outcomes of on-line delivery for teachers, learners and organisations and what future directions do those working in the field suggest?

The study focusses on the current climate in the VET sector, drawing on the broader literature relating to on-line delivery. In the following discussion, we have sought to present our findings under a series of broad and, to some extent overlapping

headings. To enhance readability, the report combines information from various information sources rather than separating literature and interview data. This structure reflects the importance of the interviews as the primary data source, with examples from the research literature and current VET practice being used to illustrate or extend the ideas presented.

'On-line delivery' in the education context is widely used to refer to all aspects of on-line activity, including the design, development and implementation of Web materials as well as the teaching and learning activities. It is in this sense that the term 'on-line delivery' is used in this review. It is not limited in scope to the technical aspects of service provision. The report also uses terms such as 'education', 'organisation', 'teacher' and 'learner' in their broadest sense to encompass the diversity of the post-compulsory education sector.



current on-line implementations

This section provides an overview of the current state of implementation of on-line delivery of education and training in Australia—identifying the stakeholders involved, the extent to which on-line delivery is used, the disciplines in which it is used and implementation strategies and management. Training is not only being provided by traditional institutions, but a variety of implementation models are emerging. These range from the offering of on-line programs through accredited bodies, such as TAFE, to industry–institution partnerships such as the QANTAS–Canberra Institute of TAFE collaboration which focusses on in-house training (http://www.cit.act.edu.au/national/cit97g.htm#QANTAS).

Since the advent of on-line technologies, educators have been exploring their potential for creating new and different kinds of learning experiences. Many of these initial implementations were limited applications, focussing on a particular technology or teaching situation. As on-line expertise develops and the experience of innovators is communicated and extended by others, on-line delivery has the potential to become mainstream in post-compulsory education and training.

on-line delivery has the potential to become mainstream in post-compulsory education and training

The rapid expansion of content available on the world wide web has provided instructors and learners with unprecedented access to both up-to-date and archived information. The extent and nature of the web has also led to concerns from educators about the quality of the material published, the ability of learners to manage the quantity of information and the lack of resources tailored for educational and training use. This has led to the emergence of web sites and portals that index on-line education resources (for example, EdNA on-line http://www.edna.edu.au/EdNA, Education Index http://www.educationindex.com and ERIC http://www.accesseric.org) and resources for learners (such as TAFE in South Australia Subject Springboards http://www.tafe.sa.edu.au/lsrsc/learn/springboards/ main.html).

the extent of on-line education and training in VET

Publications such as *Flexible delivery pilots* (ANTA 1997a) offered insights into early projects in flexible delivery and illustrate the range of technological tools tested and evaluated by practitioners. Recent conference proceedings and publications offer further examples of specific on-line applications (see for example ASCILITE and EDMEDIA). However, the extent of on-line implementation within the Australian VET sector overall is difficult to gauge, largely because of a lack of published information and the adoption of different models of implementation. This fact was noted by a number of our respondents.

In some States, on-line activities are dispersed, with individual institutes pursuing their own on-line projects. In these cases, on-line delivery represents only a small percentage of overall activities. Limited funding for on-line development and a tendency to allocate resources to specific projects were proposed as reasons for a low level of on-line implementation.

In other instances, where either development has been more centralised or resources have been focussed on a major initiative, the situation is easier to assess. For example, in South Australia, TAFE has an estimated 5000 students participating in on-line learning, with approximately 30 per cent studying completely off campus. Victoria's TAFE Virtual Campus had approximately 1600 students enrolled in September 1999; however, this number does not include students enrolled in subjects delivered partly on-line.

Moving to an on-line mode of delivery involves harnessing existing expertise and developing new skills, both in the technology and pedagogy. For organisations such as Open Training and Education Network (OTEN), moving to on-line delivery is about learning how to adapt their existing print-based distance education infrastructure and practices to take advantage of the new opportunities offered by on-line technology. For other organisations such as the Queensland Open Learning Institute (QOLN) who were early adopters of Internet technology, the shift has involved updating their tools to match the increasing sophistication of their stakeholders' needs. For many more organisations, the inclusion of on-line options represents part of a move to more flexible offerings overall.

A number of different implementation strategies emerged from the interviews and were evident in the offerings available to VET clients. Some organisations are building upon their expertise in traditional print-and-post distance education while others are developing their on-line offerings within new models informed by the principles of flexible learning. The following implementation models from TAFE in South Australia, Victoria and Queensland illustrate this mix.

- South Australia
  Without a strong tradition of distance education, TAFE in South Australia has adopted a flexible delivery model as their framework for on-line delivery. They propose an emphasis on integration of their on-line and on-campus activities. Most of their on-line enrolments have come from existing students who have moved to fully on-line or mixed mode delivery. Currently, TAFE in South Australia offers approximately 200 modules with some on-line component, including six certificate IIIs and IVs which are available completely on-line. In some cases, students can choose between face-to-face or on-line modes; in others, the two modes are integrated. On-line development began with some of the more advanced subjects, but now there is a more representative spread across different levels. The subjects chosen for on-line treatment tend to reflect State Government priorities.

- Victoria
  TAFE Virtual Campus (TAFE VC) has been designed to make on-line tools available to teachers across the State. Current statistics refer to students studying fully on-line, but many other programs use some of the on-line tools specifically constructed for this site. The aim of the on-line activities is to improve education for all students, rather than to provide an alternative to traditional distance education. Documentation on the site indicates that on-line technology will be integrated into all aspects of training, which may in turn change the way some of the existing campus-based services operate. The subjects chosen for on-line development focus on current funding priorities, high enrolment subjects and subjects judged to be suited to on-line delivery.

- Queensland
  As part of their on-line activities TAFE in Queensland has developed two delivery options. One provides flexible entry to a completely on-line procedure from enrolment to completion. A student may opt to be assigned to a local institute which offers the subject, or be allocated to another institute as available. Alternatively, modules are offered through individual institutes, perhaps across a number of sites, involving the usual enrolment and administrative procedures and on-campus facilities. Their initial focus was on high-profile modules offered across a range of disciplines. On-line options are now available for approximately 30 government-funded and fee-for-service modules. The on-line option is designed to enable on-line students to be self-sufficient.

The move to on-line delivery has meant that this type of delivery has become integrated into existing relationships, presenting new opportunities for training providers and developers. TAFE has traditionally developed partnerships across industry with employer groups, State-based training councils, industry bodies and

other training providers. On-line training as a new mode of delivery has become a part of these collaborative and consultative relationships.

The implementation of on-line delivery requires technical, instructional, content and marketing expertise. Partnerships develop when the complementary capabilities of organisations combine to fulfil these requirements. Organisations which have developed expertise in creating and implementing their own on-line training may need to consider identifying new opportunities to work with other commercial, educational and government providers. The kinds of roles organisations might play include:

- provision of training programs relating to on-line delivery to organisations and individuals on a fee-paying basis, which may include facilitation on-line or face to face
- staff development activities with Australian and overseas VET providers and universities
- franchising of materials (with or without facilitation) to other providers
- design and development of on-line training for other organisations, bringing on-line expertise into the client's environment and training their staff to facilitate the programs

Specific examples include:

- Development of specific training programs
  A team at the Canberra Institute of Technology (CIT) has developed on-line training for QANTAS staff. Designers from CIT work with subject matter experts and trainers from QANTAS to develop modules for in-house training.
- Commercial vendors and brokers
  Vendors such as CBT Systems (http://www.cbtsys.com) market pre-packaged products, such as IT certification courses, direct to clients (Bennett et al. 1999). Affiliations between commercial providers and educational institutions are also becoming increasingly common (University of Illinois 1999). Locally, Queensland Open Learning Network not only offer their own on-line courses, but act as a broker for other training providers wishing to offer courses in regional areas.
- Training and consultancy services
  Having developed expertise in implementation of the WebCT on-line course management software, TAFE in South Australia now provides WebCT training and consultancy services to Australian and overseas educational institutions.

Private and community providers have begun to explore on-line options for vocational education and training. From discussion at the Networking 99 conference,

it was evident that many such providers were still investigating the potential of on-line delivery or were in the early stages of developing on-line materials and practices.

The range of disciplines offered was extensive, with some emphasis on information technology, which probably reflected the content expertise of early adopters and the assumed IT skill levels of students in this content area. Interviewees expressed a view that many on-line programs were responding to State Government priorities. The range of subjects offered in on-line mode encompasses a broad spectrum of disciplines, available as modules or whole awards. For example Wodonga TAFE offered a diverse range of modules in the disciplines of nursing, electronics, frontline management and welding (http://www.wodonga.tafe.edu.au/courses/on-line/index.htm#no). OTEN NSW offers full award certificates in IT.

some examples of on-line projects and initiatives

While not exhaustive, the selection below highlights some of the major projects and initiatives currently under way in Australia.

education and training initiatives

- NSW TAFE On-line http://www.tafensw.edu.au/
  The NSW TAFE On-line project is a major initiative which aims to promote and support on-line delivery in New South Wales. The purpose of the project is to create an on-line environment which encompasses information and communication and supports the interaction between teacher and student. Other initiatives, which are also a part of the project, are concerned with developing the resources, infrastructure and skills which, in turn, will support on-line and off-line teaching and learning activities.

- TAFE Virtual Campus http://www.tafevc.com/
  The development of TAFE VC environment has been a major enabling strategy of the TAFE On-line 2001. TAFE VC is an on-line platform which supports a complete learning environment for the management and delivery of training. It provides an interface between students at home, the workplace or within a LAN (local area network) environment, and Victorian TAFE providers, including institutes, adult community education (ACE) and private providers. TAFE VC is being used by providers to support both their on-campus and off-campus students.

  'The site can deliver a full course or modules off campus or it can be integrated with on-campus teaching to provide the most effective learning environment' (Department of Education, Victoria 2000).

The implementation of the TAFE VC is currently moving ahead. The initial implementation meetings have been held with all TAFE providers and the addendum to the 1999 performance agreements are now finalised. Two-day staff training sessions are being carried out at each of the institutes—for teachers who will be using the TAFE VC and for the nominated provider administrators.

- ACENET http://home.vicnet.net.au/~acenet/
  ACENET is one of the ten learning networks established by the Office of Post Compulsory Education, Training and Employment (PETE). These learning networks aim to enhance access to vocational education and training amongst specific target groups throughout metropolitan and regional Victoria. Students can study on-line courses and modules, accessing the Internet at home or in local community centres.

- TAFE On-line Queensland http://www.tafe.net/
  TAFE Queensland offers on-line programs such as: automotive apprentice courseware; business courses; creative writing courses; disability studies; engineering courses; IT courses; justice studies; lifestyle courses; multimedia; recognised prior learning; Telstra site induction courses and workplace courses.

  The programs are supported through the central TAFE Queensland, which is a Queensland Government tertiary education system which delivers technical and vocational education and training and adult community education to around 360 000 local and international students per year. With a network of 16 institutes in Queensland and with a virtual campus on the Internet, TAFE in Queensland provides access to learning across communities in Australia and the world.

  TAFE in Queensland is also working with the Department of Education in Tasmania OL to develop on-line courses for K–12 school education and through Southbank Institute of TAFE involved in the College of On-line Learning (http://www.cool.qld.edu.au).

- OTEN-DE IT Virtual Campus http://www.oten.edu.au/oten/
  The NSW Department of Education and Training is developing policies and models to offer on-line training through its Distance Education branch OTEN-DE. The IT Virtual Campus of OTEN-DE is the major NSW initiative in on-line learning in the VET sector. The initiative makes use of on-line services at a number of levels. The department is utilising the technology through the administration of its traditional paper-based distance education programs, offering web-based resources for some of these programs, for example, Transport of dangerous goods (web site), and

also offering a limited number of full courses through the IT Virtual Campus (http://vc.tafensw.edu.au/). The on-line site reports use of 'the Internet to offer some subjects and sections of courses, to enrich course delivery, and to provide better contact between staff and students' (Department of Education and Training, TAFE NSW 2000).

- Queensland Open Learning Network http://www.qoln.net/
  Queensland Open Learning Network has embarked on a major upgrade of its forty learning centres located throughout the rural, regional and remote areas of the State. As an experienced user of older Internet technologies such as Audiographics, QOLN is expanding the range of technological tools available to students and training providers to offer web and e-mail access. These developments reflect the increasing demand for access to new technologies in geographically isolated communities, thereby increasing the range of formal and informal learning opportunities in these areas.

- TAFE South Australia On-line http://www.tafe.sa.edu.au/
  The SA TAFE On-line project is a major initiative which aims to promote and support on-line delivery in South Australia. The site offers uses access to the individual institutes and campuses, course information, award courses and locations, student services, VET access and equity information, committee information, specific data for international students and details about specific on-line services.

- Learnscope National Project http://www.learnscope.anta.gov.au/
  LearnScope is an Australian National Training Authority (ANTA) staff development initiative designed to assist registered training organisations (RTOs) to use innovative and flexible delivery approaches in the delivery of their products and services through the development of a network of skilled and well-informed practitioners who can primarily support the implementation of training packages within their own organisation and/or who can provide advice to other organisations.

- WestOne http://www.westone.wa.gov.au/
  WestOne On-line was established by the Western Australian Government with a mission to enhance vocational education and training in Western Australia through the use of digital technologies. A pilot program begun in 1998 incorporates twelve initiatives which focus on the development and delivery of on-line materials including short courses, award modules and information services. These projects are collaborative efforts between TAFE colleges, divisions within the Department of Training and private sector organisations.

- Toolbox Development Project http://www.anta.gov.au/toolbox/
  The Toolbox Development Project is funded by ANTA as one of the National Flexible Delivery Projects. The purpose of the project is to develop multimedia training resources to assist registered training organisations to deliver training flexibly against training packages. Toolboxes are useful collections of ready-made training materials. The Toolbox initiative might prove significant in the staff development area as it has some early practical support and the evaluation of the process has been positive (Queensland Open Learning Network 1999).

- VETTWeb http://www.vettweb.net.au/
  VETTWeb has been designed as a global Internet campus to offer a world of new educational opportunities for people involved in training, from students to private companies and training providers. 'VETTWeb is a Virtual Building consisting of many Floors that contain organisations primarily focussed on training. Each Floor can have many Rooms and each Room can have many Cabinets' (Open Learning Institute, TAFE Queensland 2000). (This current implementation is limited to two providers as at March 2000.)

resource provision initiatives

The selection below lists some of the sites developing educational resources which can be accessed as part of VET programs. Some are aimed at the VET-in-Schools initiative.

- Education Network Australia http://www.edna.edu.au/EdNA/
  The vocational education and training pages on the Education Network Australia site give information about the history, organisation and structures of TAFE and the adult and community education sectors. The importance of this site is that most of the pages are reviewed and there is a measure of quality to the resources.

- The Source http://www.thesource.gov.au
  This site by the Department of Education, Training and Youth Affairs is a comprehensive and informative resource for Australia's youth. It covers issues from justice to skill improvement and from sexuality to rural services and is aimed at the young market and school VET links.

- Vocational Education Community On-line (VECO) http://www.veco.ash.org.au
  Vocational Education Community On-line is a collection of Internet-based projects and activities building on-line communities for those involved in VET-in-Schools programs in Australia, and particularly targetted to

structured workplace learning program co-ordinators. Initiated by the Australian Student Traineeship Foundation (ASTF), VECO is run in partnership with Aussie SchoolHouse. VECO is concerned with developing on-line communities to foster communication, sharing of resources, development of professional networks and recognition of achievement through the use of Internet and communications technologies, including e-mail and world wide web tools.

- Curriculum Corporation http://www.curriculum.edu.au/
  The site includes sections which provide news, advice on teaching, learning and assessment and resources on subjects such as technology, Asia and democracy. This site has a VET-in-Schools section, which has some resources for classroom use.

- Australian Council of Trade Unions Worksite for schools http://www.worksite.actu.asn.au/
  This site produced by the ACTU is an interesting resource. It features insights into the history of work, as well as comprehensive information about work-related issues such as equal opportunity, unions and health and safety. (Intended audience is high school students and their teachers.)

summary

- There is evidence of extensive exploration and experimentation with on-line learning in Australia.
- While its extent is hard to gauge, and while significant on-line activities are evident in every State and Territory, on-line delivery in VET is yet to become a mainstream activity.
- A variety of different implementation models are being adopted in different States and by different types of training organisations. This is reflected internationally.
- There is currently no accepted wisdom of how to implement on-line learning, either in Australia or internationally.
- The implementation of on-line delivery requires technical, instructional, content and marketing expertise. Partnerships are becoming evident when the complementary capabilities of organisations combine to fulfil these requirements.
- Many of the implementations have been developed through collaboration between TAFE, private and community providers with employer organisations input.

- Designers are adapting the use of on-line technologies to suit their own needs and circumstances.
- The diversity of activity is indicative of the embryonic stage of development of on-line learning.
- Policy-makers should not be concerned about the apparent lack of cohesiveness since it is indicative of the current stage of development in Australia.
- While there may be criticism of the lack of cohesiveness in on-line learning, it may be that such a context is supportive of innovation processes and of the variety of models currently appearing.

on-line teaching strategies

This section describes the impact of on-line delivery upon instructional strategies and teaching practice, with particular attention to new and innovative approaches. The issues of concern were:

- how on-line teachers claim their role is changing and how that in turn relates to skills they need to develop and the way they work
- how teaching materials were developed for on-line courses
- what strategies teachers use and their reflections on their value

In a nationwide Australian study which sought input from lecturers who were engaged in aspects of on-line teaching, participants identified both substantial and minor barriers to the implementation of such technologies into teaching (Gosper et al. 1996). Factors identified as substantial barriers to change included: time and expertise involved in preparing material for teaching in new formats; lack of time for devoting effort into information technology training; a system that emphasises research over innovative teaching; increased workload; and capital costs associated with information technology. Those issues identified as slight barriers to change included:

Teacher involvement in on-line delivery extends beyond adapting classroom strategies to designing on-line specific resources

- concern for the impact on face-to-face teaching
- use of prepackaged, externally produced multimedia products
- concern about confidentiality and security
- students' need for social interaction
- the perception that information technology threatens job security

Experience from implementation of on-line courses suggested that traditional face-to-face strategies need to be reconceptualised to take advantage of the unique opportunities offered by the emerging on-line technologies (Simoff & Maher 1997). A growing number of writers and teachers have voiced the need to recognise that the

skills of effective on-line delivery also require an understanding of student needs and motivation (Bonk & Cunningham 1998). While on-line delivery might increase viability and address access and equity concerns, it requires a rethinking of the teacher's role.

It is important to note that the changing role of the instructor is a wider issue highlighted by growing interest in constructivist approaches to learning (Duffy & Cunningham 1996; Jonassen 1998) and more flexible approaches to delivery (for discussion relevant to TAFE see ANTA 1997b).

On-line delivery also requires teachers to rethink and adapt the instructional strategies they use, particularly those which support communication and collaboration between students who may now be at a distance (Oliver et al. 1998).

In reviewing the development of an industry site, Hedberg et al. (in press) demonstrated that it is possible to use an on-line site for collaboration between the trainers and trainees. Using this approach the site becomes the repository of resources and the organisational memory of past, present and future staff. The concept of employing the site to provide training alone was shown to have a limited appeal in organisational renewal.

It has been argued that computer-mediated communications (CMC) facilitated within on-line learning environments can support those techniques known to develop higher-order thinking skills, such as small-group interaction, in-depth discussion, and interchange of ideas between the participants (Romiszowski 1997).

In an investigation of the way in which on-line support materials and open-ended inquiry-based activities encourage collaboration and influence learners' cognitive processing and engagement, Oliver, Omari and Herrington (1997) found that expository interactions which could lead to higher-order thinking and, thus, cognitive interactions rarely materialised, whereas a high level of procedural interactions were observed. Their findings led to recommendations for the design of on-line pedagogical strategies such as:

- carefully planning group composition
- requiring learners to provide feedback on their outcomes in order to maintain focus and ensure completion of learning activities
- introducing learning activities after the learners become familiar with the WWW environment
- employing more adaptive forms of scaffolding for selective assistance

Teacher involvement in on-line delivery extends beyond adapting classroom strategies to designing on-line specific resources. There is a long tradition of instructional design and materials development, well documented in the literature. For

example Vissher-Voerman et al. (1999) provided an up-to-date overview of design and development paradigms evident in education and training. There is evidence of use of such approaches in current Australian on-line projects; for example, an element of the commercial arm of CIT, Metale, has proposed a simplified model (http://www.cit.act.edu.au/metale/01devel/mhe0105.htm#Identify) while Gibson (1997) briefly discussed roles within the development team. An understanding of instructional design and development of on-line courses is becoming an essential skill of the on-line teacher.

the changing role of the instructor

All of the interviewees indicated an awareness of the changing role of the instructor as one of the critical issues in on-line delivery, although one respondent felt that many teachers had not begun to think about the issues. While some organisations are sufficiently advanced to be dealing with specific teaching issues, others are trying to raise awareness of on-line learning and reassure staff that the introduction of new technologies does not threaten their positions. Working with people to integrate on-line technology into the way they work, rather than using the technology, as an 'add-on' for teaching was a key issue. Recognition of the need to take people through the process at their own pace and time depending on their attitudes and skills was also deemed important.

Many of the staff development issues raised by those interviewed for this project were also reflected in two recent publications from the VET sector—*From desk to disk* (ANTA 1997b) and *TAFE teachers on-line* (ANTA 1998b). Both reports set the staff development needs to teachers and trainers within the specific context of the sector highlighting key issues, such as the development of a wide range of skills (technical, pedagogical and organisational) and the dissemination of information relevant to the Australian context.

Staff development programs currently in place or in preparation, aim to equip teachers with the skills to support students and to manage the technology through formal qualifications, short training courses and other activities. Strategies include:

- raising awareness about the issues for on-line learners
- developing both face-to-face and on-line teaching skills, in particular, communication and facilitation
- identification and development of easy-to-use tools
- training in the use of specific technology tools (for example, Internet skills, course management software, communication tools)
- the introduction of support systems (for example, help desk)

- establishment of communication networks (for example, support groups, workshops, field days, etc.)

Some organisations have developed their own training programs, a number of which have then been offered on a fee-for-service basis to others. Others have become involved in State-based or national initiatives. For example participants in the LearnScope initiative at West Coast College in Western Australia have pursued their own projects, developing on-line materials and improving technical skills at the same time. Research in the school and university sector suggests the need for staff development approaches that match the skills and awareness level of the individual, thus enabling teachers to link new technical skills to their own expertise through work on specific projects or experiences of on-line learning (Henderson & Brady 1999; Bennett et al. 1999).

Changes in the way teachers work was also highlighted as an important issue. Most respondents felt that there was an awareness of the way new technological and pedagogical approaches impact upon work practices, but little response have been received from management as yet. Respondents raised a number of issues in relation to work practices, such as:

- the need for changes to work practices as a part of the change-management process
- the need for flexibility to allow different ways of working, reflecting the current diversity of work practices
- the problem of on-line work being undervalued because it is seen as a secondary activity
- the need to address occupational health and safety issues related to multiple work locations (for example, working from home)
- the need to make realistic assessments of workloads because on-line teaching is more intensive than traditional distance education

The representative from Queensland TAFE commented on the range of approaches to work practices in response to on-line delivery. Four current mechanisms were identified:

- On-line teaching is outsourced to casual or contract staff.
- Teachers take on the on-line components as part of their normal workload.
- Teachers with on-line subjects or component are allocated a reduced workload.
- Teachers with on-line subjects or component are allocated an additional payment.

instructional strategies used in delivery of on-line courses

To identify the types of instructional strategies currently in use or planned for use in their organisations, the respondents were asked to refer to the following list of suggestions:

- on-line content delivery
- e-mail submission of work
- discussion lists
- chat rooms
- quizzes on-line
- other on-line strategies
- off-line strategies

Most responded that all of these strategies were already in use or planned to be used. Many commented on the importance of making a range of options available so that teachers could tailor instruction to meet the needs of their groups. For example, although TAFE in South Australia has adopted WebCT as their on-line delivery software, teachers are able to customise their use of WebCT by selecting a combination of tools from the suite available, according to their view of learning, student needs, subject matter etc.

On-line content delivery was the most common strategy used, although a number of respondents commented that this was being de-emphasised in favour of more extensive use of learning interaction such as communication tools. E-mail submission of assessment items was less common, as many subjects required some, or all assessment to be conducted in the workplace.

Although communication tools were highlighted as an important aspect of on-line teaching and learning, a number of respondents commented that these facilities were not actually being used or are being underutilised. A number of explanations were offered, including the lack of structured activity or facilitation to focus discussion, and a lack of interest because students did not see a need to communicate because it wasn't an assessment task or competency requirement. When communication tools were used, asynchronous communication was more popular than synchronous. Asynchronous communication (such as e-mail, bulletin boards and discussion lists) was valued for its flexibility and convenience for students and teachers. Synchronous technologies were seen to present problems for those not wanting to be constrained by time and those lacking good typing skills. Technical issues also seemed to favour asynchronous modes. However some respondents

commented that synchronous communication tools were useful for 'drop-in' sessions or orientation activities. Communication was also recognised as demanding additional time from both student and teacher, with one respondent suggesting that a balance should be struck between on- and off-line activities.

On-line quizzes are being used reasonably frequently, for either formative or summative assessment. Common question types include multiple choice, short answer and drag and drop. Other on-line strategies related to administrative tasks, such as posting results on the Web (anonymously), dealing with general enquiries via e-mail or distributing information through electronic newsletters. Off-line strategies being used in conjunction with on-line delivery include the distribution of print-based or multimedia CD-ROM materials, phone contact (particularly initial contact from tutors to students) and orientation or practical workshops.

the instructional design process for on-line delivery

Interviews revealed numerous models for managing the instructional design process for on-line delivery. A team approach to the design and development of on-line materials was common among the organisations we contacted. Respondents highlighted the importance of establishing cross-functional teams involving a range of people, including teachers, designers, technical advisers, managers and administration and support staff. In organisations which had adopted a centralised model for implementation, teams were drawn from expertise across the organisation. A team-based approach was also preferred as a way to ensure that instructional designers did not become an isolated group of experts, remote from the practice of teaching. In at least one case, a team-based approach was a requirement of project funding.

In some organisations instructional designers were full-time, in-house staff who may be attached to centralised or specialised production units. In others, instructional designers were employed on a contract basis to work on specific projects according to project needs and funding.

Secondment of teaching staff to instructional design positions was also common; however, respondents seemed to believe that this was changing as more on-line expertise was developed by in-house and contract designers. One respondent pointed out that much of the initial work in implementing on-line technologies was done by teachers and practitioners, usually within specific projects.

A number of respondents highlighted the need to develop instructional design skills among their own teaching staff. One commented that teachers routinely made instructional design decisions and this knowledge and skill needed to be developed in

the context of on-line teaching. Professional development programs which focussed on instructional design skills and the development of on-line planning and design templates were suggested as ways to involve teachers more in instructional design. Such strategies aimed to either assist teachers to prepare for working in a design team or to enable them to take on instructional design as part of their teaching duties.

That design, development and teaching activities should be separate functions was a commonly held perception. Design was seen as a task for teams of experts, generally including an instructional design specialist. Once the design process was complete, the task of developing and assembling the graphics, HTML and web programming into a web-based learning package was passed on to a separate development team. Teaching activities took place after a package has been designed and developed. While some organisations chose to retain all of these activities in-house, others outsourced aspects or employed contract or casual staff as required.

summary

- There is a recognition that the role of the instructor and the way he/she works changes in the on-line environment.
- There is an acceptance of the notion that traditional face-to-face instructional strategies and resources need be reconceptualised for on-line learning.
- The sector is characterised by experimentation with the full gamut of strategies illustrated over the sector.
- There is a recognised need in the sector for teachers and support staff to develop instructional design skills.
- Commonly, the design models adopted separate out design, development and teaching activities. This model may militate against success.
- Most institutions espouse the use of design models. The published models in the sector tend to be primitive.

issues for on-line learners

While on-line education and training offers new opportunities and challenges for teachers, the role of learners in the on-line environment is also likely to change.

For students accustomed to attending a campus, on-line delivery has the potential to offer learners greater flexibility in where and when they study. For distance students, on-line study can improve communication with instructors and peers and increase access to information sources.

Students who have participated in on-line learning environments frequently referred to the value of input from the teacher regarding specific learning activities (Lockyer, Patterson, & Harper 1999; Oliver & Omari 1999). This was particularly an issue for on-line environments adopted as components of, or replacement for usual on-campus or face-to-face delivery. This suggested the need to ensure that students have adequate access to, and opportunities for, communication with their teachers within on-line learning environments.

on-line learning environments have helped to overcome feelings of isolation

Those students engaged in distance education or training have reported that on-line learning environments provided important contact with teachers and fellow students (Graham & Scarborough 1999). Thus, on-line learning environments have helped to overcome feelings of isolation previously characteristic of traditional distance education and training, which consisted of primarily printed text resources and communication via post.

On-line learning may also challenge learners to develop new skills and reconceptualise their requirements of them as a learner.

Cornell and Martin (1997) suggested that challenges for learners and facilitating learning included:

- maintaining learner motivation
- degree of acceptance by student and teacher
- prior participant knowledge
- attitudes toward technology
- level of content

- degree of interactivity
- difficulty in using the system
- ease of accessibility to the system
- teacher and student ability
- communication skills

Similar issues were found by Corrent-Agostinho and Hedberg (1998) in their implementation of on-line learning in a postgraduate educational technology course. In their study, students reported that lack of motivation to participate, procedural confusion (for example, when to sign on) and technical difficulties as major issues to be reconciled for on-line learning.

Learners in Oliver and Omari's (1999) study of on-line problem-based learning reported that the on-line environment required them to spend more time preparing for class activities that were different from those they had previously experienced. Despite the extra workload, students responded positively to the new learning environment.

Ensuring that students have access to the technology required for on-line learning was also of concern to many providers of vocational education and training. While some providers assume Internet access as a pre-requisite to enrolment, others were addressing access and equity issues by providing computing facilities on campus or in the community (see examples above for QOLN and ACENET on pages 13 and 14).

The preparation of students for the demands of the on-line environment, so that they are able to adapt rapidly to the new environment and to capitalise on its advantages, was also a major issue for learners. In addition to providing technical training and support, some institutions are attempting to raise awareness and address expectations of prospective and beginning on-line students. Examples of this approach come from the University of Illinois (http://illinois.on-line.uillinois.edu/model/Studentprofile.htm) and Butler County Community College (http://www.buccc.cc.ks.us/WebCrs/on-linelearn.htm).

opportunities and challenges for on-line students

Interviewees identified some of the advantages and disadvantages noted by their on-line students.

The flexibility offered by on-line delivery appeared to be the main benefits identified by students. Particularly important is the opportunity to study where and when they choose. For those with family commitments home might be the preferred place of study. Respondents also highlighted a growing trend for training in the workplace, with on-line delivery allowing people to study at work.

While studying on-line also helped individuals to become more familiar with the technology and gain confidence in its use, these users were also able to expand their communication networks, have regular contact with teachers and other students and receive faster responses to their queries. Some students also reported that they find on-line study more motivating.

On the negative side, students regularly encountered problems with the reliability and speed of the technology, particularly those depending on dial-up access. The cost of having to purchase their own computer equipment or organise regular access was also a problem for some. Students working independently in rural or remote areas can be particularly disadvantaged due to poor technical infrastructure and costly Internet access. In addition to technical issues, many learners experienced difficulty in adapting to the self-directed nature of on-line learning—a challenge commonly reported in the literature relating to all modes of distance education, including paper-based forms.

Respondents also raised issues for on-line learners which teachers and designers need to be aware of when preparing materials and teaching on-line. Learners need to see value in using the technology; for example, communication tools that meet the needs of geographically dispersed students. Some studies indicated that the print-and-post mode of distance education offered little opportunity for students to interact with staff and other students and access to few resources beyond those with which they are provided (Rural, Social and Economic Research Centre 1995). Cuskelly et al. (1997) argued that new communication technologies can address many of the needs of distance students, needs such as increased flexibility, access to resources and staff and decreased turnaround time for assignments.

Respondents remarked that learners also need support to become more self-regulated and maintain motivation. On-line technology should support different ways of learning, such as different levels of involvement and a variety of activities. These issues are well understood by traditional distance education practitioners (see for example Sherry 1996).

Kellie and Ferguson (1998) argued that understanding student perspectives and experiences of on-line learning can guide the way organisations support learners to develop the skills needed to make the transition from 'traditional' to technology-supported environments. This factor was reflected in statements from a number of respondents who believed that most of the issues students faced were human ones and that good on-line teaching was about building community, caring for students and being responsive.

student access to the Internet

Ensuring that students have access to the Internet remains an issue that all organisations adopting on-line delivery must address. Most organisations leave students to arrange their own Internet access from home or through a commercial service provider. Those who do not have access to these facilities may nevertheless have access to computer facilities within their own or an affiliated institution, or to access community-based services, for example Internet cafes, libraries, telecentres. One respondent also suggested that on-line access in classrooms would also be important in integrating on-line activities into other modes of learning.

The lack of infrastructure is a major problem for students in rural and remote areas and, to some extent, in regional areas. Although the potential benefits of on-line learning are apparent, for these students access is often slow and unreliable and charges can be very high.

The cost of Internet access is also an issue for students in metropolitan areas where charges are considerably lower. Of greatest contention is who should pay for access. Some respondents believed that students should not be made to bear an additional cost because they are studying on-line rather than face-to-face or by print-based distance education. Two respondents claimed that this cost should be met by the educational/training organisation by transferring resources from other areas (for example room rental). Another respondent felt that materials should be designed so that most of the work could be undertaken offline in order to reduce costs to students.

preparing students for learning in an on-line environment

All of the respondents acknowledged that preparing students to learn in an on-line environment was one of the major challenges in moving towards on-line delivery. Although the level of awareness of these issues within organisations appeared to be high, many have not yet developed a comprehensive strategy to address student preparation.

Provision of on-line materials was the most common preparation strategy adopted by the organisations consulted. In most cases these materials were made available to students as information resources, although one organisation facilitated the process by having tutors helping students to become familiar with the new environment. Another offered an induction course which learners complete at their own pace. Respondents commonly referred to the need for providing general information about what it means to be studying on-line, as well as covering the software and hardware requirements and tools. One respondent suggested that to be a successful on-line learner, students had not only to learn the mechanics of using the

technology, but also had to become socialised to the on-line environment. Having students think about their own expectations and communicating what was expected of them in the on-line environment was also considered important.

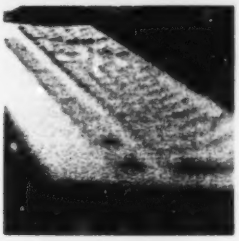
Two organisations offered training workshops as part of their orientation activities for on-line students. One respondent commented that the compulsory one-day workshop helped to get students ready to start working on-line at the beginning of the semester, rather than their taking weeks to feel comfortable with the technology.

Further strategies which respondents suggested would assist students in adapting to the on-line environment included:

- technical support for students beginning to use on-line technology
- use of a simple, consistent on-line design for all learning materials
- making all learning support facilities and functions accessible on-line (for example, library services, textbook ordering)
- ensuring that materials are self-directed and independent
- access to student counselling services and development of a mentoring program

summary

- Learners need to be prepared and supported through the initial stages of using on-line environments.
- Institutions are using a variety of strategies to introduce learners to on-line environments.
- Not all learners make effective use of the opportunities offered in on-line learning.
- Many institutions are making assumptions about the resources available to students and access costs. The assumptions may not be appropriate for many users, especially country students.
- The questions related to who should pay for access and will there be a re-allocation of resources have yet to be fully explored much less resolved.



resource implications

Moving to on-line delivery places new demands on the resources of education and training providers. There are significant costs involved in establishing or accessing an appropriate infrastructure, attracting staff for new types of positions or re-training current staff and preparing the organisation for changes in procedures and practices which take place within the administrative, technical and instructional divisions of the organisation.

Researchers and practitioners from the higher education sector have begun to analyse and document the costs associated with on-line delivery and are now reporting on strategies for managing the demands.

Bartolic-Zlomislic and Bates (1999) presented findings based on three case studies of institutions offering courses by on-line delivery. The research suggested that to benefit from on-line delivery organisations addressed the following needs:

- substantial start-up funds
- additional time for staff and students to learn how to use new technology
- the introduction of appropriate organisational and administrative procedures

More specific to the VET context, Webb and Cilesio (1998) outlined the resources issues raised by their experience establishing and maintaining an on-line course. The issues highlighted suggested that expanding on-line delivery from small-scale projects to more widespread offerings has an impact on broader management and administrative activities. In a later publication Webb and Cilesio (1999) offered a costing model that begins to identify specific types of costs raised by on-line delivery.

the lack of a consistent framework for cost-benefit analysis made generalisations difficult

Such cases are important in gaining an understanding of the resource demands of on-line delivery through its various stages of establishment and implementation. However the lack of a consistent framework for cost-benefit analysis made generalisations difficult (Cunningham et al. 1997). The University of Illinois faculty seminar (1999) suggested that 'sound on-line instruction is not likely to cost less than

traditional instruction' (p.51). Further research is needed to help providers determine what those costs might be in their situation and how they might be offset by the benefits they can achieve.

infrastructure

Establishing and maintaining the basic technical infrastructure needed to support on-line delivery and access can be a substantial cost to education and training providers.

Requisite new and upgraded computer hardware can include servers, networks and desktop computers. Providing desktop Internet access for teaching staff so that on-line activities become integrated into the way people work is a major challenge, particularly for large organisations with geographically dispersed staff. One respondent noted that on-line learning had changed the way students used computers provided within his organisation. Previously students had used synchronous communication tools in groups around one machine. Recently, more self-paced, web-based learning packages have been designed for individual use and thus necessitates the increased provision of computers. Furthermore, as Internet usage has expanded, some organisations have found their existing infrastructure to be inadequate for coping with the increased demand and have been faced with new challenges to information technology management.

In addition to hardware requirements, software to support on-line learning is needed. Also required are management systems for on-line learning which provide user authentication, on-line publishing and communication tools as well as class management and administration options. While a variety of such products are now commercially available (for example TopClass, Blackboard and WebCT), a number of organisations we consulted had developed their own tools in the absence of suitable alternatives. Obviously, some locally developed tools offer distinct advantages. However, commitment to a particular tool has dangers when it is either not a commonly used tool, or if it requires specialised formatting of resources, or the likelihood of tool maintenance is limited. Review of course management tools are available on-line (Hazari 1998; Teaching and Learning Centre, Murdoch University 1998).

One respondent, in particular, raised the issue of the additional requirements of administrative systems of on-line delivery. Maintenance of a web site that enabled current and potential students to access relevant and complete information and services is a necessary commitment to moving to on-line delivery. A central site, which enabled students to search for a suitable course of study and integrate services that catered for the needs, was suggested as a powerful promotional tool. This issue is

also reflected in the earlier comments by respondents suggesting the need for on-line technology to integrate into all aspects of the education/training experience.

The education and training providers interviewed had developed different strategies for managing the infrastructure needs created by on-line delivery. Some organisations had built up their own infrastructure, while others had entered into partnerships with, or outsourced some requirements, to commercial providers.

human resources

The need for suitably qualified staff to provide technical support and create on-line learning materials was another issue highlighted by the respondents. In general, organisations interviewed had managed personnel issues by developing expertise in-house. In particular, organisations which had a history of print-based delivery have had many of the skills and processes upon which to build their on-line expertise. A common pattern emerged whereby teaching staff had moved into development or project management roles as they achieved on-line expertise through their own and other projects. Some respondents felt that this trend would decrease now that a pool of expertise had developed outside the organisation. In some cases, particular support services, such as basic maintenance, had been permanently outsourced or individuals with specific expertise, for example in web development, were contracted to project teams. One TAFE institute had a pool of their own multimedia graduates from which to draw additional staff or to whom they could contract-out work.

In their investigation of staff development activities at Australian universities, Ellis, O'Reilly and Debreceny (1998) found that the provision of staff development for on-line teaching and learning was not being undertaken by the established academic staff development units. Rather, a model of shared responsibility and tailored courses was emerging whereby co-operation and collaboration with other service units such as computing centres and libraries was utilised to respond to staff development needs. They found that the training session covered pedagogical issues in designing on-line courses, designing web pages, and use of course-authoring systems. This study found that while staff development in on-line education was being undertaken, many believed that, due to issues of funding, staff resourcing and competing priorities between units, all training needs were not being addressed.

Initial and ongoing professional development for staff involved in on-line delivery have also had an impact upon organisations contacted. Many respondents were keen to highlight the ongoing nature of the demand, as technologies and systems changed. A variety of models, including formal and informal training courses, development projects and action learning emerged from our discussions. One

organisation that had initially focussed efforts on training teaching staff in developing materials for the web, had transferred its attention to issues relating to on-line design and teaching subsequent to development activities being taken on by teams of graphic designers and programmers. Another organisation now offered its on-line teaching course to fee-paying enrollees from external organisations. One respondent also suggested that professional development programs for management and administrative staff which focussed on aspects such as priority-setting and resource allocation were critical to ensuring that on-line delivery became part of mainstream activity of organisations.

funding models

The additional costs imposed by on-line delivery have required many organisations to re-assess their funding models.

Centralisation of funds, resources and effort has been a strategy adopted by TAFE in a number of States and is based upon an assumption that such a strategy is more likely to produce a high-quality outcome. Funding for centralised development units was mentioned by one respondent who highlighted the difficulties of meeting the demand for services when funding is based on a cost-recovery basis. Furthermore, difficulties in assessing the real costs of on-line delivery have prompted two of the organisations consulted to establish projects to investigate the resource implications.

In considering the resource implications of on-line delivery for their organisations, respondents identified several issues and strategies. Organisations may need to redirect their existing funding to address new demands, for example in their 1996 report Spark et al. noted the need for a 'strategic shift in funding priority from *bricks and mortar* to technology infrastructures' (quoted from document http://www.otfe.vic.gov.au/learningtechnologies /nctreport/8.htm).

Furthermore, external funding is increasingly being offered through Commonwealth Government and State Government initiatives to fund project-based activity. This funding model may also present difficulties for organisations as they attempt to scale successful projects across their offerings. This issue was highlighted by one of the respondents who was concerned that, because his current on-line work had been funded on a project basis, many of the issues raised were not being addressed as they did not yet impact on mainstream delivery.

It is also important to note the global trend to shift costs to students, freeing up funding for other resources. Bates's (1996) comment that 'technology can in fact widen and *reduce* access to education' (p.4, emphasis added) is still valid, with many institutions requiring students to either purchase their own equipment or pay fees for

on-line access. This additional financial burden on students will inevitably exclude some participants from on-line programs.

summary

- The sector is characterised by the development of in-house expertise as an initial response to the demand.
- There is a shared concern for the maintenance of programs developed through project funding.
- Real costs of developing on-line programs are rarely fully examined before embarking on projects.
- Addressing the resource implications for infrastructure, personnel, professional development and administration tends to be ad hoc unless the systems are centralised.
- New funding models are being developed to reflect the changing resource priorities.

policy

This section describes aspects of organisational policy development related to on-line delivery. The maturing of any initiative is marked by its incorporation first of all into strategic planning and then into policy development activities. At the same time procedures to support that policy are developed. Policy development—that is, the emergence of innovations which subsequently become mainstream activity—is multi-layered in that Commonwealth Government policy tends to be reflected at the State level and State policy at the institutional level.

The development of policy relating to the role of technology is becoming evident and is being undertaken by vocational education and training authorities at the Commonwealth Government and State Government levels and educational institutions and training providers at an organisational level.

The directions and priorities outlined in documents such as the Commonwealth Government's *Strategic framework for the information economy* (1998) and ANTA's paper, *Australia's national strategy for vocational education and training 1998–2003: A bridge to the future* (1998a) have provided guidance for the development of State-level policy, such as TAFE On-line 2001 (State Training Board of Victoria 1998). In addition, reviews such as that published by Cunningham et al. (1997) have overviewed, at a global level, a number of key influences on the implementation of on-line technology on education, specifically the effects of globalisation, technology convergence and changes in the provision of education. At the international level, accreditation, levels of government support and consumer protection were seen as global issues for policy focussed on on-line learning. 'Agencies have scarcely begun to consider the policy implications for borderless transmission in education' (Cunningham et al. 1997, p.176).

The development of policy relating to the role of technology is becoming evident

Policies at an organisational level can facilitate a move away from individual, isolated projects to a more concerted approach which allows resources to be allocated according to specific priorities. Early reviews of the state of the sector, such as the 1997 report by Mitchell and Bleur foreshadowed the need for well-formed

policy and policy tools, such as decision trees and checklists for administrators to manage the range of issues related to technology choice, competitive advantage and partnerships.

Some States have taken up this challenge and this is well illustrated by documentation on TAFE web sites. Some of these institutions have developed vision statements, strategic plans and policy and procedure documents for on-line learning. For example, TAFE in South Australia has developed a comprehensive set of policies and procedures (http://www.tafe.sa.edu.au/lsrsc/index.html) which include planning for development of on-line learning materials, management of delivery and delivery processes. Others have such statements for their whole enterprise but not specifically for the on-line issues. For example, New South Wales, Queensland, Western Australia and Tasmania have well-developed planning and vision documents which address the whole enterprise.

Moreover, many of the associated institutions, such as OTEN-DE and CIT, have implemented their stated policies, initially in a small scale, through trialing and evaluation of pilot programs. Some of these initiatives have included high levels of collaboration between institutions and outside commercial providers (see Canberra Institute of Technology), and others have been quite self-contained, making use of developing expertise within institutions (IT Virtual Campus of OTEN-DE).

responses from interviewees

All respondents recognised the need for strategic planning and policy development to address issues relating to on-line delivery.

A number of respondents were concerned at the lack of on-line teaching and learning policy and direction within their organisation, envisaging territorial battles which might occur as institutions sought to form effective service structures. One suggested that an increasing awareness of on-line issues within his organisation would lead people to ask questions about policy and provide some impetus for the process.

Other organisations were addressing these issues within a change-management framework, in the advanced stages of strategic planning from which policies would be developed, or already had in place a range of policies at various levels. Broad-level policies often dealt with flexible delivery rather than on-line specifically or included on-line options within an organisation-wide shift to incorporate new technologies. The ANTA Flexible Delivery Fellowships program (http://www.anta.gov.au/fellow/) supports recipients to develop and implement a major change management plan that is then disseminated to the VET community.

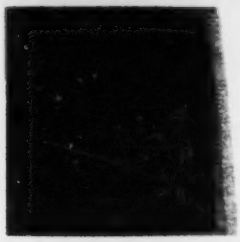
All respondents expressed a high level of awareness of State-level policy directions and emphasised that their own policies should be seen within the scope of government initiatives.

policy-related materials: sample

- NSW TAFE policy in VET issues
  http://www.bvet.nsw.gov.au/publicat/bv01pu1.htm
  This is an example of well-developed policy on the whole enterprise, not specific to on-line learning environments. It would appear that the policies and procedures put in place are assumed to address the on-line issues.
- South Australia, Learning Systems and Resources Standing Committee
  http://www.tafe.sa.edu.au/lsrsc/index.html
  TAFE in South Australia has developed a comprehensive set of policies and procedures which include planning for development of on-line learning materials, management of delivery and delivery processes.

summary

- Many institutions have published policies on delivery of training, but few have taken the next step to formalise their approach to on-line delivery.
- It is possibly too early in the development cycle to see well-developed policies.
- Constant change in the capability of the technology and user access works against comprehensive policy development.



evaluation and outcomes

While there is much published literature which claims that substantial benefits may be derived from on-line technology in education and training, few systematic and rigorous evaluations have been published and there is, at this time, limited reporting of outcomes for instructors, learners and organisations.

Furthermore, the lack of published evaluation studies may also reflect the relative immaturity of the use of on-line technology in education and training. It may be too early in the life-cycle of many projects for participants to examine their activities systematically and critically. This may explain the high proportion of descriptive reports that tend to emphasise sharing of ideas and content, collaboration and experimentation. One major exception is a report on the evaluation and implementation of technology-based learning systems in higher education (Alexander & McKenzie, 1998). This report claimed that while there were many successful on-line teaching implementations, careful project selection, retraining for teaching in this mode and support for learners using this mode were critical to achieve effective outcomes for on-line technologies.

studies are beginning to emerge that provide insights into the difficulties faced by students and teachers

While studies are beginning to emerge that provide insights into the difficulties faced by students and teachers, most of the reports are anecdotal and remain word-of-mouth only—part of the 'grey' literature. The main anecdotal concerns related to the lack of experience of teaching staff in running on-line courses, and the speed and nature of feedback required to ensure that learners can understand their errors and are able to correct them. The nature of vocational education and training is such that emphasis is not placed on research and its subsequent publication. Stories of success and failure are more likely to be communicated through more informal networks of practitioners.

In trying to understand this situation some insights may be gained by noting that in the school context, despite a high level of technology spending, little is known about the outcomes achieved in the classroom. McKenzie (1995) suggested that a lack of expertise and resources, the low value placed on research and the high demands of

implementing technology programs in schools are factors which hamper thorough investigation. Johnson (1996) argued that the lack of research into the effectiveness of technology is due to an inappropriate focus on programmed instruction and poor research design and execution. This may also be the case for reporting on-line learning outcomes in VET.

Several evaluations have been conducted of on-line initiatives from the delivery perspective, such as the Queensland Open Learning Network (1999) review of the ANTA Toolboxes. But the design has been criticised and seen as insufficient for student use:

> *Future toolbox development should discourage developers from creating resources with low levels of interactivity for learners based on page turning models of presentation. Learners should be given reasons and contexts for interacting with the learning materials. Developers should design learning activities that engage the learners and encourage knowledge construction. The instructional design should look for opportunities to build and develop learners' key skills. Assessment activities should reflect assessment of learners' competency rather than learners' memory and knowledge of facts* (p.9).

evaluation studies in higher education

Again, specific to the higher education sector, the University of Illinois faculty seminar report (1999) observed that debate had occurred over the extent to which the educational benefits of on-line teaching and learning can be evaluated. The authors concluded that 'evaluation of on-line learning is multifaceted and subtle, and learning competence is only part of the evaluation need' (p.36). Disagreement over the merits of evaluating learning outcomes does not explain the low level of investigation into on-line delivery's more modest claims—increased flexibility, access to new markets, cost-effectiveness. Papers reporting on particular on-line implementations have suggested some issues for further attention.

Studies that investigated learners' perceptions have consistently gathered positive feedback regarding the general issues associated with on-line learning (Graham & Scarborough 1999; Jonassen et al. 1999; Lockyer, Harper & Patterson 1999; Macpherson, Bennett & Priest 1997; Oliver & Omari 1999). In their exploration of on-line problem-based learning employed with a group of on-campus students in an undergraduate university course, Oliver and Omari (1999) found that students responded positively to the learning environment and perceived that the problem-based activities contributed substantially to their learning and enjoyment in the course. Similar results were found by Lockyer, Patterson and Harper (1999) in an investigation of collaborative learning in an undergraduate health education subject

where 83 per cent of students felt the web-based tutorials were 'as effective' or 'more effective' than face-to-face tutorials in facilitating their understanding of the topics covered in the subject.

Technology appeared to be influencing the way teachers and learners worked and interacted. It has been argued that on-line learning environments which involve activities in which learners communicate with each other asynchronously allow for reflection and learner control (Laurillard 1993). This has been demonstrated in studies where learners have perceived the opportunity to engage in independent research on the topic and reflect on the learning task. These conditions have contributed to learning in the on-line setting (Lockyer et al. 1999; Simoff & Maher 1997).

Studies, specifically those which involve communication between students and group learning strategies, have shown that most learners contribute actively and that the distribution of communication (that is, the amount of input) is spread quite evenly among the learners (Harasim 1993; Romiszowski & Mason 1996). Generally, it has been found that students who tend to participate less frequently in face-to-face, classroom situations contribute much more on-line learning situations (Bellman, Tindimubona & Arias Jr. 1993; Goddard 1996; Harasim 1993; Ruberg, Taylor & Moore 1996). On-line learning environments have been shown to be particularly beneficial in terms of facilitating participation for mature-aged, female, and handicapped students (Bellman et al. 1993; Harasim 1993; Ruberg, Taylor & Moore 1996), and in supporting those students for whom English is a second language (Agostinho, Lefoe & Hedberg 1997).

Ryan and Woodward (1998) noted that the textual nature of communication increased the possibility of misunderstanding requiring vigilance and time management to be added to the complexity to tutoring tasks. They have also suggested that concepts like *attendance, listening, socialising* and *speaking* take on new meanings in the on-line environment for students.

Time management was also an issue raised for students in Oliver and Omari's (1999) paper, with students spending more time on preparation and tasks for an on-line subject than for other subjects. The time commitment for on-line activities appears to be highly dependent on the level of interaction the instructor chooses to provide and the types and frequency of the tasks set for students (Bartolic-Zlomislic & Bates 1999). These findings indicated that the time required for on-line interaction might diminish cost savings anticipated from a reduction of face-to-face interaction.

Low retention rates have long been a feature of distance education, and researchers have attempted to uncover students' reasons for withdrawing from study. In a review of this literature, the Rural Social and Economic Research Centre concluded that there are many factors beyond the actual study materials critical to

students' success in distance learning. Figures from Webb (1999) suggested a marked improvement in working and retention rates for on-line delivery when compared with traditional distance mode. Further research is needed to understand the reasons for such a difference.

The potential for increased flexibility for instructors and learners was widely cited in favour of on-line delivery. However, tension exists between offering students flexibility in scheduling their study and involving them in activities such as on-line discussions (Ryan & Woodward 1998). Further investigation of the notion of flexibility and the ways it can be best provided for instructors and learners is needed.

responses from interviewees

Interview participants also responded to a series of questions about studies of the impact or effectiveness of on-line teaching and learning within their organisation.

Some respondents reported only limited participation in evaluation studies, relying instead on research and development reported in the literature, at conferences or through contact with colleagues. The difficulty in locating information on the effectiveness of on-line learning or the costs of on-line delivery was a problem highlighted by a number of those interviewed.

In at least two States the inclusion of an evaluation phase was a requirement of government-funded on-line development projects. One respondent suggested that these evaluations were often of variable quality, perhaps due to a lack of expertise.

Respondents indicated that formative evaluation, undertaken as part of development and project work, was the most common approach to appraising on-line activities. Often this form of evaluation was conducted informally, not always related to specific projects and rarely published or reported in the literature. This anecdotal research was part of building on-line expertise by exploring different models and raising issues. This lack of reported evaluation concerned a number of the respondents, with one indicating that within his organisation, teachers are being assisted to conduct their own evaluations to generate data on the effectiveness of on-line programs. Familiarising teachers with evaluation models and frameworks (for example the EVAG National Framework for Flexible Delivery model) can be included within staff development programs. Formal evaluations currently undertaken, as reported by interviewees, have included:

- surveys collecting quantitative and qualitative data during and after on-line implementations (student attitudes and experiences, retention rates, completion rates)

- a survey of staff participating in the LearnScope staff develop project
- needs analysis surveys by a student association to identify services and facilities required by on-line students
- a long-term qualitative investigation of a community dissemination on-line awareness program
- cost-benefit analyses of on-line delivery
- evaluations and technical trials of infrastructure, network management strategies and on-line management systems and environments

summary

As practitioners learn more about on-line delivery from their own experiences and the outcomes from specific initiatives become known, a fuller picture might be gleaned. However, the need remains for more rigorous studies that are valued for their ability to inform the implementation of on-line delivery in vocational education and training contexts.

- Most anecdotal reports are positive; however, several studies have emphasised the changing nature of what constitutes teaching and how best to support learning in on-line environments.
- Positive gains have been argued for students whose English language skills mean they are slower to contribute.
- Claims that these learning environments are providing options for specific groups are being supported.
- The most important issues include identifying techniques which enable teaching staff to support students on-line and for changing study behaviours for students.
- Much of the current evaluation in the VET sector is informal.
- The traditional high dropout rates for distance education modes may not be as high for on-line delivery.

findings and directions for further research

The directions and perceived trends for future research and development in the Australian and international contexts are important considerations for educators, trainers, administrators and policy-makers. This study illustrates the embryonic nature of on-line delivery, not only in the VET sector but also in higher education generally. There is no single underlying issue to be addressed, but the maturation of on-line learning should be realised for all participants once innovators start to develop realistic strategic, pedagogical and commercial models. This view was supported by the interviewees, who raised a broad range of issues on future directions.

The growing acceptance of new educational philosophies and practices, such as constructivism and action learning during the 1980s and 1990s, have challenged the use of more didactic approaches to learning. There appears to be a clear understanding in the sector that on-line learning offers new pedagogical opportunities and that reconceptualising courses translated from other modes is essential if these types of goals are to be achieved. The linking of these concepts to practice through design teams and models is not currently articulated in the literature for the VET sector. There is a need to develop good design models to support this process.

if we are shifting the emphasis of learning, competencies will also need to be re-examined

literature review

There has been much written in both the popular and academic literature regarding the emergence of the 'knowledge worker' who 'earns a living by using knowledge in order to create new knowledge' (Romiszowski 1997, p. 25). Education and training concepts associated with the knowledge worker include self-directed, just-in-time and key skills of information analysis and creative problem-solving. Thus, it has been argued that what is now required of education and training programs is design and development of effective 'creative-thinking training programs' (Romiszowski 1997, p.33). Therefore, if we are shifting the emphasis of learning, competencies will also

need to be re-examined. Assessment in competency-based approaches will still need to be strongly linked to workplace assessment as a means of authentication not achievable in on-line learning. In addition, programs with a strong mentoring element, where the establishment of relationships is critical, may not be as effective in delivering the planned outcomes.

There is a history of literature on distance education, related to the issues learners face. However, it is not clear how applicable findings based on this literature are for on-line learners. Most data reported tend to focus on implementation and the instructor's perspective; the learner perspective is mainly overlooked. There is a need for research on the experiences of on-line learners and the corresponding mechanisms that will be required to support their needs and ensure a quality experience.

State models for offering on-line learning are both centralised and distributed. Cost-effectiveness studies of on-line learning in the VET sector may drive development of a more national and even global view of offerings, provided the accreditation issues can be addressed. This issue raised by Cunningham et al. (1997) in their *Review of the convergence between global media networks and higher education*, may be just as valid in the VET sector. Cost structures may facilitate international alliances, particularly in the business sector where there is already a long history of activity in corporate training—a traditional market niche of the VET sector. Further research is needed to help providers determine what those costs might be in their situation and how those costs might be offset by the benefits achieved.

A major issue for all stakeholders is the constant evolution of the underlying technology. New and more powerful software tools are constantly appearing, and the actual infrastructure is constantly evolving. The availability of broadband services, offering the potential for live video input to learning environments will require a further reconceptualisation of approaches to on-line delivery (Tvede et al. 1999). Moreover, new partnerships may need to be formed with the broadband industry to enable the VET and higher education sector to remain key players.

Much of the current work is yet to be moved to large-scale offerings, and for strategic planners, this is a vital issue. There are not only technical considerations here, but also personnel and staffing issues. Furthermore, the constant question from administrators about the effectiveness and quality of on-line learning still needs to be adequately addressed for confident decisions on large-scale deployment to be made.

responses from interviewees

All respondents predicted that interest in on-line delivery from students, teachers, education and training institutions, industry and government would continue to grow

in the future. On-line delivery was considered to be a competitive and economic imperative, as it becomes a part of the core business of training organisations, not merely a tool for teaching.

One respondent predicted that this might result in a tension between co-operation and competition as training providers become less geographically focussed, and, to avoid unnecessary reproduction of materials and systems, organisations would have to negotiate access with other providers. From such a tension might arise new partnerships and arrangements between content and training providers, with new relationships breaking down the barriers between training providers, industry and the community providing sustainable funding.

Others predicted that on-line delivery would accompany a variety of changes in training and education such as:

- a need for greater customisation
- a trend towards more just-in-time training
- a move to smaller, more focussed modules
- an increasing commitment to flexible delivery
- an expansion or adaptation of offerings as appropriate
- the availability of a range of on-line delivery methods used differently by different providers
- a trend towards training in the workplace
- the need for an alternative and enhancement to print-based distance education

A number of respondents suggested that the provision of on-line options was an essential part of preparing an IT-capable workforce that would find employment in the 'knowledge economy'. Even students not specifically studying information technology subjects would gain experience with the computer applications and communication tools which are becoming increasingly important in the contemporary workplace.

For designers and developers of on-line learning packages, an increase in interest and funding would increase demand for their services. The previous experience of traditional distance education providers may offer these organisations an advantage in moving to on-line delivery if they are able to adapt their existing knowledge and processes. For institutions that previously offered only face-to-face teaching, many new issues will arise.

conclusions and future directions

Both the literature reviewed and the key stakeholders have raised a broad range of issues relating to the future development of on-line delivery.

The following summarises the relevant issues for three stakeholder groups. The target audiences for these summaries are:

- educators and trainers beginning to explore the potential of on-line delivery who require guidelines for initiation and best practice
- educators and trainers currently involved in on-line delivery who wish to understand the wider scope of practice in Australia as a frame of reference for their experience
- education and training administrators and policy-makers who are charged with the responsibility for exploring the resource implications and developing policy related to delivery

educators and trainers beginning to explore on-line contexts

- While extent is hard to gauge, and while significant on-line activities are evident in every State and Territory, on-line delivery in VET is yet to become a mainstream activity.
- There is currently no accepted wisdom of how to implement on-line learning, either in Australia or internationally.
- The implementation of on-line delivery requires technical, instructional, content and marketing expertise. Partnerships are becoming evident when the complementary capabilities of organisations combine to fulfil these requirements.
- The diversity of activity is indicative of the embryonic stage of development of on-line learning.
- There is a recognition that the role of the instructor and the way he/she works changes in the on-line environment.
- There is an acceptance of the notion that traditional face-to-face instructional strategies and resources need to be reconceptualised for on-line learning.
- There is a recognised need in the sector for teachers and support staff to develop instructional design skills.
- Learners need to be prepared and supported through the initial stages of using on-line environments.
- Not all learners make effective use of the opportunities offered in on-line learning.

- The sector is characterised by the development of in-house expertise as an initial response to the demand.
- The technology will continue to change, with implications for every aspect of the enterprise. The imminent introduction of broadband technologies will offer new partnership opportunities and new learning challenges.
- Most anecdotal reports about the success of on-line delivery are positive. However, several studies have emphasised the changing nature of what constitutes teaching and how best to support learning in on-line environments.

on-line educators and trainers

In addition to a number of the issues listed above, the following will also be relevant to this group:

- A variety of different implementation models are being adopted in different States and by different types of training organisations. This situation is reflected internationally.
- Many of the implementations have been developed by collaboration between TAFE, private and community providers with employer organisation input.
- Designers are adapting the use of on-line technologies to suit their own needs and circumstances.
- Policy-makers therefore should not be concerned about the apparent lack of cohesion—it is indicative of the current stage of development in Australia.
- The sector is characterised by a lack of published reporting of the design, development and evaluation of on-line learning environments.
- The sector is characterised by experimentation with the full gamut of strategies illustrated over the sector.
- Most institutions espouse the use of design models. The published models in the sector tend to be primitive.
- Not all learners make effective use of the opportunities offered in on-line learning.
- There is a shared concern for the maintenance of programs that are developed through project funding.
- On-line learning potential will be realised. Innovators will start to develop realistic strategic, pedagogical and commercial models, which will be scalable.

- There is a need for design models to support design teams in reconceptualising traditional modes of instruction for on-line delivery.
- There is a lack of information on the learner experience and their needs.
- Positive gains have been argued for students whose English language skills mean they are slower in contributing.
- Claims that these learning environments are providing options for specific groups are being supported.

administrators and policy-makers

In addition to the issues relevant to the two groups noted above, the following issues are also pertinent to this group:

- There is evidence of extensive exploration and experimentation with on-line learning in Australia.
- While there may be criticism of the lack of cohesiveness in on-line learning, it may be this circumstance is supportive of innovation processes and of the variety of models that are appearing.
- Commonly, the design models adopted separate out design, development and teaching activities. These models may work against success.
- Institutions are using a variety of strategies to introduce learners to on-line environments.
- Many institutions are making assumptions about the resources available to students and access costs. The assumptions may not be appropriate for many users, especially country students.
- Who should pay for access—will there be a re-allocation of resources?
- The sector is characterised by the development of in-house expertise as an initial response to the demand.
- Real costs of developing on-line programs are rarely fully examined before embarking on projects.
- Addressing the resource implications for infrastructure, personnel, professional development and administration tends to be ad hoc unless the systems are centralised.
- New funding models are being developed to reflect the changing resource priorities.
- Many institutions have published policies on delivery of training, but few have taken the next step to formalise their approach to on-line delivery.

- It is possibly too soon in the development cycle to see well-developed policies.
- Constant change in the capability of the technology and user access works against comprehensive policy development.
- Costing and cost-effectiveness studies for on-line delivery are needed to inform administrators and funding bodies in decision-making.
- Partnerships to reduce costs and increase access may become crucial for scaling up on-line offerings. Those partnerships may include not only the business sector, but also other State, national and international collaborations.
- There will need to be a shift in focus from 'bricks and mortar' to communication infrastructure.
- Over the next few years it can be expected that improved management systems for on-line delivery will also improve the experience for all involved.
- Much of the current evaluation in the VET sector is informal.
- The traditionally high dropout rates for distance education modes may not be as high for on-line delivery.
- Evaluations show that two important issues for administrators are the identification of ways to develop teaching the provision of on-line support to staff and the changing study behaviours for students.

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Other sources for interested readers

International examples in the higher education sector are available from sources such as University of Illinois (1999, pp.10–12) http://www.vpaau.illinoisedu/tid/report/tid-final-12-5.pdf

Examples of web-based instruction (focussed on health and related disciplines) http://www.uchsc.edu/chancllr/offedu/wbiexamples.html

Maricopa Community College, 'Teaching and learning on the WWW', searchable collection of over 703 examples of how the web is being used for learning http://www.mcli.dist.maricopa.edu/tl/

Teaching and learning on the Internet, links to resources, readings and related sites http://www.cudenver.edu/~mryder/itc_data/net_teach.html

appendix

organisational sources

Key representatives from the following organisations were interviewed in the course of this project:

- Australian National Training Authority (ANTA)
- Canberra Institute of Technology (CIT)
- Office of Training and Further Education (Victoria)
- OTEN Open Training and Education Network (NSW)
- Queensland Open Learning Network
- TAFE NSW
- TAFE Queensland
- TAFE South Australia
- West Coast College (WA)

The interviewees selected represent a range of levels and roles within their organisations including senior manager, project manager, instructional designer/developer, teacher/instructor, on-line support manager, training coordinator. Interviews were undertaken on the understanding that the anonymity of the respondents would be preserved.

interview protocol

introduction

As mentioned in our e-mail, we are conducting a consolidation study for the National Centre for Vocational Education Research on on-line delivery of education and training.

We'd like to understand the scope of your organisation's involvement in on-line delivery using the following questions to focus our conversation.

current on-line implementations

What is the extent of on-line education and training in your organisation?	• How many of your offerings are delivered or supported using on-line technology? • How is on-line technology used in those cases (e.g. completely on-line, on-line supplementing face-to-face delivery)? • What type of courses are being delivered on-line (particular disciplines, topics, types of knowledge etc.)?
What on-line education and training are you currently developing for or with other organisations?	• What type of organisations are you working with? • What is the nature of your relationship with these organisations (e.g. training provider, developing education and training for delivery within your institution)? • Do these courses differ from those offered within your own organisation (e.g. in terms of how on-line technology is used or the type of course offered)?
Is there a particular on-line project that you are involved in that you would like to highlight?	Please describe (for example you might refer to main features, innovations, successful or unsuccessful projects)

on-line teaching strategies

Do you think your organisation has managed the changing role of the instructor in on-line education and training?	• If yes, how has this been accomplished? • How has your organisation addressed professional development for on-line delivery? • Has your organisation implemented new work practices for on-line education and training?
At what level is the instructional design process for on-line delivery being managed in your organisation?	For example: • individual teachers design on-line courses • a central unit designs on-line courses • the organisation is following a particular on-line delivery design model?

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What types of instructional strategies are being used in the delivery of on-line courses? (Please also rank in order of frequency)	◆ On-line content delivery ◆ E-mail submission of work ◆ Discussion lists ◆ Chat rooms ◆ Quizzes on-line ◆ Other on-line strategies (please describe) ◆ Off-line strategies (please describe)

issues for on-line learners

Does your organisation prepare students for learning in an on-line environment?	If yes, please describe.
What issues do your students studying on-line face?	For example: ◆ problems reported ◆ benefits expressed
How is your organisation addressing the issue of student access to the Internet?	For example: ◆ students must arrange their own access ◆ students can use on-campus computer labs ◆ computer rental agreements are available ◆ the same courses are also offered in other modes (e.g. face-to-face or print-based distance packages)

resource implications

What is the impact of on-line delivery for your organisation in terms of resources?	For example: ◆ technology infrastructure ◆ technology support staff ◆ instructional design/materials development/redesign ◆ professional development

policy

Do your organisation's strategic plans include issues related to on-line delivery?	For example: ◆ targetting on-line markets ◆ technology infrastructure and integration ◆ staff appointments and staff development

Does your organisation have specific policies related to on-line delivery?	Please describe.

evaluation and outcomes

Has your organisation been involved in any studies of the impact or effectiveness of on-line teaching and learning within your programs?	Please describe.

future directions

What role do you see on-line education and training taking in your organisation's future?	• What are your next steps? • Will you continue to expand your offerings? • Will you target new markets?

closing

Are there any publications, brochures, web sites, etc. that illustrate or provide more information on the responses you've provided?

Is there any other information or issues that we haven't yet covered that you wish to add?

Are there any other people you suggest we should contact to assist us further with our study?

This review of research on vocational education and training is one of a series of reports commissioned to guide the development of future national research and evaluation priorities.

Professor Barry Harper is director of the Digital Media Centre, University of Wollongong, an R&D centre focussing on digital convergence. His research includes cognitive tool technology, support of learning design and on line learning communities.

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